WHAT IS CLAIMED IS:

1. An optical fiber measuring module to be laid on a structure for measuring at least one physical quantity from the distortion and temperature of the structure, comprising:

an optical fiber cable including an optical fiber core, a cladding and a covering layer,

a base member for holding the optical fiber cable, and

an attachment member for attaching the base member to the structure.

2. An optical fiber measuring module according to claim 1, further comprising:

an attaching device provided between the attachment member and the structure for attaching the attachment member to the structure, and

a locking device provided between the base member and the attachment member for locking the base member in the attachment member.

3. An optical fiber measuring module according to claim 2, wherein the attachment member includes an adhering layer provided on the attachment member and made of an adhesive or a welding agent for adhering the attachment member and the structure.

4. An optical fiber measuring module according to claim 2, wherein the attaching device attaches the attachment member to the structure by pushing an engaging projection engageable with a bottomed locking groove formed in the structure and narrower at an opening than at a bottom portion into the locking groove via a resilient sheet made of a resilient member.

5. An optical fiber measuring module according to claim 2, wherein the locking device locks the base member in the attachment member by the engagement of engaging portions provided at the base member with locking portions provided at the attachment member.

6. An optical fiber measuring module according to claim 5, wherein the locking device sets an initial distortion of the optical fiber cable for the correction of a zero of a measurement value by differing intervals of the locking portions provided at the attachment member from those of the engaging portions provided at the base member to give a distortion resulting from elongation or contraction to the base member locked in the attachment member.

7. An optical fiber measuring module according to claim 1, wherein the base member holds two or three optical fiber cables at specified distances from each other, thereby enabling the measurement of at least one state quantity from the elongation, bending and partial lateral pressure of the structure on which the optical fiber measuring module is laid from measurement values of distortions of optical fiber cables and an increasing/decreasing pattern of the measurement values.

8. An optical fiber measuring module according to claim 1, wherein the base member is strip-shaped and holds two optical fiber cables along the longitudinal direction of the base member at a specified distance form each other.

9. An optical fiber measuring module according to claim 1, wherein the base member includes a strip-shaped flat portion and a wall portion standing substantially upright substantially in the middle of the flat portion, two optical fiber cables are held along the longitudinal direction of the flat portion at a specified distance from each other, and another optical fiber cable is held along the longitudinal direction of the wall portion.

10. An optical fiber measuring module according to claim 1, wherein the base member is formed to have a tubular shape, and three optical fiber cables are held along the longitudinal direction of the inner wall of the tubular base member at specified distances from each other.

11. An optical fiber measuring module according to claim 10, wherein the optical fiber cables are spirally held on the inner wall of the tubular base member.

12. An optical fiber measuring module according to claim 1, wherein the base member is formed with slits for enhancing the flexibility of the base member in such a manner as to avoid the held optical fiber cable, and the optical fiber measuring module can be so laid as not to exceed a permissible distortion of the optical fiber cable upon being handled.

13. An optical fiber measuring module according to claim 1, wherein the base member is formed with slits for enhancing the flexibility of the base member in such a manner as to avoid the held optical fiber cable, whereby the distortion of the optical fiber cable can be prevented from exceeding a permissible value even in response to an excessive deformation of the structure on which the optical fiber measuring module is laid.

14. An optical fiber measuring module according to claim 1, wherein the base member holds the optical fiber cable in a wavy manner and is formed with notches used to bend the base member at its lateral ends located on extensions of tangents to the optical fiber cable extending from peaks of waves to troughs thereof, whereby the distortion of the optical fiber cable resulting from bending can be prevented from exceeding a permissible distortion by bending the base member along the notches and the optical fiber cable to cause the optical fiber cable to be only twisted.

15. An optical fiber measuring module according to claim 1, comprising:

base members having a standardized length, and

coupling portions of the optical fiber cable provided at the opposite ends of each standardized base member,

wherein the coupling portions of the optical fiber cables are optically coupled to each other to successively connect the base members, thereby enabling structures of different sizes to be handled.

16. An optical fiber measuring module according to claim 1, further comprising a polarizing ring formed by looping the optical fiber cable, wherein a polarized state of a signal light propagating in the optical fiber cable is corrected by the polarizing ring.

17. An optical fiber measuring module according to claim 16, further comprising:

a ring base member for holding the optical fiber cable forming the polarizing ring, and

a loading mechanism capable of giving a distortion in a circumferential direction of the ring base member,

wherein the optical fiber cable held by the ring base member is distorted to correct the distortion by giving the distortion in the circumferential direction of the ring base member by means of the loading mechanism.

18. An optical fiber measuring module according to claim 17, wherein the loading mechanism includes:

a discontinuous portion provided in the ring base member,

a loading member which can be held in contact with the opposite ends of the ring base member facing the discontinuous portion, and

a loading-member shaft provided substantially in the center of the loading member and rotatably supporting the loading member,

wherein the length of the discontinuous portion of the ring base member is changed by rotating the loading member about the loading-member shaft, thereby changing the distortion of the ring base member.